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LCEC Guidelines

on Preparing Technical Proposal for Indoor Water Reduction for Residential and Commercial Applications

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Applies to LEA financing mechanism loans

Prepared by the Lebanese Center for Energy Conservation

Introduction:

The Lebanese Environmental Action (LEA) is a national financing mechanism dedicated to the financing of environmental loans for water, air and environment. LEA is a joint initiative between the Central Bank of Lebanon (BDL) and the Ministry of Energy and Water (MEW).

As part of the contract signed between BDL and the Lebanese Center for Energy Conservation (LCEC) under the name "Technical Support Consultancy Services Agreement in Energy Efficiency and Renewable Energy", the Technical Support Unit to the Central Bank of Lebanon (BDL) at LCEC is dedicated to offer BDL technical assistance to evaluate the eligibility of submitted loans under LEA.

Important Notes:

1. *This project proposal guideline is designed to help potential beneficiaries, consultants, and contractors in preparing comprehensive technical reports and proposals about Indoor Water Reduction for Residential and Commercial Applications.*

2. *This project proposal template is a mandatory requirement towards facilitating the green loan application process through the national financing mechanism LEA.*

3. *This project proposal template is prepared by the Lebanese Center for Energy Conservation-Technical Support Unit to the Central Bank of Lebanon, and is available for public use.*

4. *This guideline will be updated constantly, kindly always refer to the latest version.*

5. *For questions, clarifications, or suggestions, please contact the LCEC: 01-569101 or by email: energy@lcec.org.lb*

Evaluation of projects requesting financing of indoor water reduction for residential and commercial applications under LEA will be based on these issued Guidelines. Contractors are entailed to abide by the requirements set in these guidelines and must submit the technical reports following the steps and regulations clearly identified.

I. Introduction

Although Lebanon is geographically located in a relatively favorable position in terms of rainfall and water resources, recent assessments have shown an imbalance between water availability and demand. Water quantity and quality are being deteriorated by human activities. Actions to preserve water resources are minimal. In addition, human actions have a direct impact on water availability and water replenishment. Deforestation, soil erosion and urbanization result in diminished groundwater recharge, scarcer water resources and poorer water quality.

The residential and commercial sectors have their share in water consumption. Domestic water use in Lebanon is estimated to be around 220 liters/capita.day.[1] The domestic water consumption in Lebanon is around 500 Mm^3/year and present around 32% of the total water consumption.

The residential and commercial sectors could play an important role in reducing water consumption while meeting the required demands. Indoor water reduction through the use of water-efficient fixtures can reduce domestic water consumption and lessen the burden on potable water supply and wastewater systems.

This guideline is for the application of water-efficient fixtures in the residential and commercial sectors.

[1] Source: Ministry of Energy and Water (MoEW). (2010). National Water Sector Strategy.

II. Water-Efficient Fixtures

1. Applicability for LEA

It is important to pinpoint that not all items under water-efficient fixtures are financed under the LEA financing mechanism. This section provides a clear list of the financeable items to prepare the technical study for the water-efficient fixture measure accordingly.

For the purpose of this guideline, the LEED v4 Indoor Water Use Reduction Calculator. LEED (Leadership in Energy and Environmental Design) is an ecology-oriented building certification program run under the auspices of the U.S. Green Building Council (USGBC).

According to the LEED v4 Indoor Water Use Reduction Calculator, type of fixtures eligible under the LEA financing mechanism are:

- Showerheads;
- WC Flushing Cistern of a Toilet Water Closet;
- Lavatory Faucet;
- Kitchen Faucet;
- Bidet Mixer (under lavatory faucet type);
- Urinals Flushing Cistern.

2. Requirements under LEA

This section covers the requirements under LEA and the information to include in the technical study. As a minimum, the study should include the following:

a. Provide the list of water-efficient fixtures to be installed at the facility;
b. Provide the distribution of each water-efficient fixtures;
c. Provide the datasheet of each item, highlighting the flow rate;
d. Provide the official BOQ from the supplier/contractor that should include:
    - Supplier/Contractor details;
    - Fixture (including the reference number of each) cost in USD/item or LBP/item;
e. Conduct the water saving analysis using the LEED v4 Indoor Water Use Reduction Calculator attached in section 5;
f. Print and attach all 3 sheets of the calculator to the project proposal;
g. As a summary, insert and complete Table 1 in the project proposal.

Table 1 List of Fixtures

Location (Example: kitchen, bathroom 1, bathroom 2, etc.)	Type of fixture	Brand	Reference number	Flow Rate (liter/minute)
Insert text here	*Insert text here*	*Insert text here*	*Insert text here*	*Insert text here*
Insert text here	*Insert text here*	*Insert text here*	*Insert text here*	*Insert text here*
Insert text here	*Insert text here*	*Insert text here*	*Insert text here*	*Insert text here*

3. Water Reduction Target

Project proposals requesting financing for the water-efficient fixtures under LEA should have **at least 20% reduction** in the project's water consumption compared to baseline conditions. **Projects with less than 20% water reduction will be disqualified.** The project shall install a flow meter to measure the water consumption of the property.

4. Water Efficient Fixtures

Water efficient fixtures are fixtures that reduce water consumption without altering the user's experience. These fixtures either reduce unneeded water use such as too much water in a toilet flush or mix air bubbles with the water flow of faucets and showerheads. Some fixtures reduce unnecessary flow through timed spring-loaded push buttons or electronic sensors. Water reduction varies between 20 to 40% depending on the type of fixture.

4.1 Showerheads

Showering accounts for nearly 17% of domestic water consumption in a household. It adds up to nearly 150 l/day. A family could save 10,000L per year, approximately 20% of its use, by installing water efficient showerheads. Since these water savings will reduce demands on water heaters, they will also save energy. The base flow for conventional units is 2.5 gallons/minute (gpm) or 9.5 liters/minute (lpm) for residential and commercial facilities both for the duration of 480 secs as per the US Green Building Council (LEED).

4.2 WC Flushing Cisterns

Water consumption at home is highest in toilets. It accounts for nearly 30-40% percent of an average indoor water consumption of a household. New technologies have reduced the flush volume to 3-6 liters per flush while still providing equal performance. New technologies have allowed water savings between 20 to 60%. Old toilets used up to 7 (gpf). The baseflow toilets consume 1.6 gallons/flush (gpf) or 6.0 liters/flush (lpf) as per the US Green Building Council (LEED). High efficiency toilets can reach 1.28 (gpf) or 5 (lpf).

4.3 Lavatory and Kitchen Faucets

Modern sink and kitchen faucets or old ones equipped with aerators can save between 30-40 % water of an average indoor water consumption of a household. Aerators mix air with water, visually increasing the flow and consequently reducing unneeded water consumption. Since these water savings reduce demands on water heaters, households will also save energy. The base flow for conventional units is 2.2 gpm or 8.3 lpm for residential and 0.5 gpm or 1.9 lpm in commercial facilities both for the duration of 60 secs per the US Green Building Council (LEED).

4.4 Urinals

Replacing standards urinals with water efficient urinals can save between 1.9 to 17 lpf, without sacrificing performance. Savings with high efficiency urinals vary from 1 to 4.5 gpf (4 to 18 lpf) Dry urinals do not use water at all. The urine outlet valve opens and closes to discharge urine into the sewer and prevent odors.

5. Environmental Sustainability Analysis

Environmental sustainability analysis is the calculation of the water savings that will arise upon the installation of the water efficient fixtures. For this purpose, beneficiaries are requested to use the LEED v4 Indoor Water Use Reduction Calculator, available for free download on the following link:

https://www.usgbc.org/resources/indoor-water-use-calculator

- Step 1: carefully read the instruction tab. Be sure to enable macros and to select the SI unit of measurement;
- Step 2: Name your project in the second tab (Group 1). Complete the spreadsheet;
- Step 3: Include the results of Design & Construction (Summary D+C) in the project proposal;
- Step 4: Print and attach all 3 sheets of the calculator to the project proposal.

III. Tips for Indoor Water Reduction

Reducing water consumption can be achieved primarily through water efficient fixtures but also through reducing leaks, harvesting water from open surfaces and recycling greywater and wastewater.

1. Leak detection equipment

Leak detection equipment are installed on the main supply lines of households, public or commercial space. They can detect abnormal flow patterns and shut the water flow to reduce losses. Leaks in buildings are not easily detected leading to unnecessary consumption of water. Leak detection equipment do not reduce water consumption per se but avoid unneeded use especially important in metered facilities.

2. Rainwater harvesting

Water harvesting is water collected from roofs when it rains and potentially from air conditioning condensate. The collected water can be stored and used in irrigation and/or flushing toilets. The volume of collected rainwater is approximately equal to the surface area of the roof multiplied by the average rainwater depth per year minus about 25% in losses through evaporation. The first rain event is usually not stored because it carries dust and dirt accumulated during the dry season. The amount of saved water will depend on location (rainfall depth per year), the size of the roof and the type of dwelling (building or single house).

3. Greywater treatment and reuse

Greywater is wastewater coming from sinks, showers, baths and dishwashers. It does not contain organic waste nor excrement. This water can be reused immediately or with minimal treatment in flushing and irrigation but needs treatment if stored. Treatment can be through filtration and disinfection using chlorine for example or through simple biological treatment systems. Plumbing must be adjusted in order to isolate greywater from wastewater and to allow a separate distribution network for water closets to allow flushing with harvested and greywater.